

Venn Diagrams (H)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

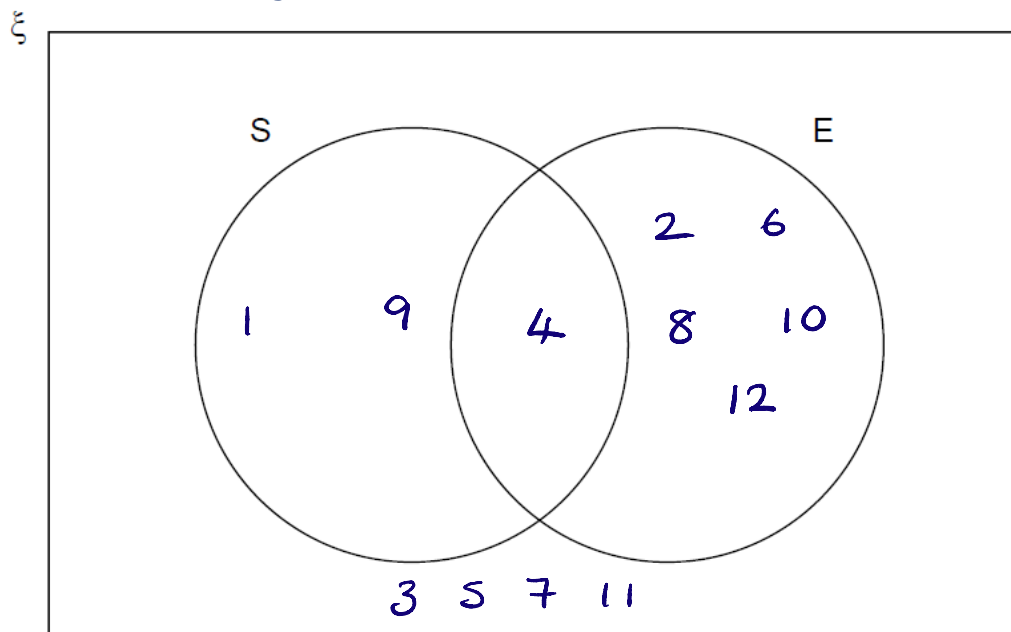
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|--------------|---------------|
| Name: | Mel@JustMaths |
| Total Marks: | Solutions |

1. $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

S = square numbers 1 4 9

E = even numbers 2 4 6 8 10 12

(a) Complete the Venn diagram.



[3]

(b) One of the numbers is chosen at random.

Write down $P(S \cap E)$

$$\frac{1}{12}$$

[1]

2. Sami asked 50 people which drinks they liked from tea, coffee and milk.

All 50 people like at least one of the drinks

19 people like all three drinks. ✓

16 people like tea and coffee but do not like milk. ✓

21 people like coffee and milk. ✓

24 people like tea and milk. ✓

40 people like coffee. ✓

1 person likes only milk.

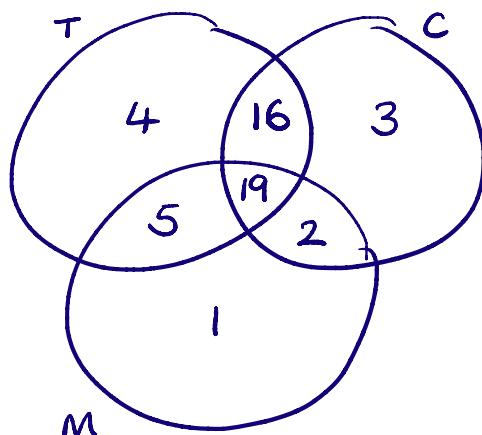
Sami selects at random one of the 50 people.

(a) Work out the probability that this person likes tea.

$$24 - 19 = 5$$

$$16 + 3 + 19 + 2 + 5 + 1 = 46$$

$$50 - 46 = 4$$



$$21 - 19 = 2$$

$$16 + 19 + 2 = 37$$

$$40 - 37 = 3$$

$$P(T) \Rightarrow 4 + 16 + 19 + 5 = 44$$

$$\frac{44}{50}$$

..... [4]

(b) Given that the person selected at random from the 50 people likes tea, find the probability that this person also likes exactly one other drink.

$$5 + 16 = 21$$

$$\frac{21}{44}$$

[2]

3. A skills test has two sections, literacy (L) and numeracy (N).

One day everyone who took the skills test passed at least one section. ✓

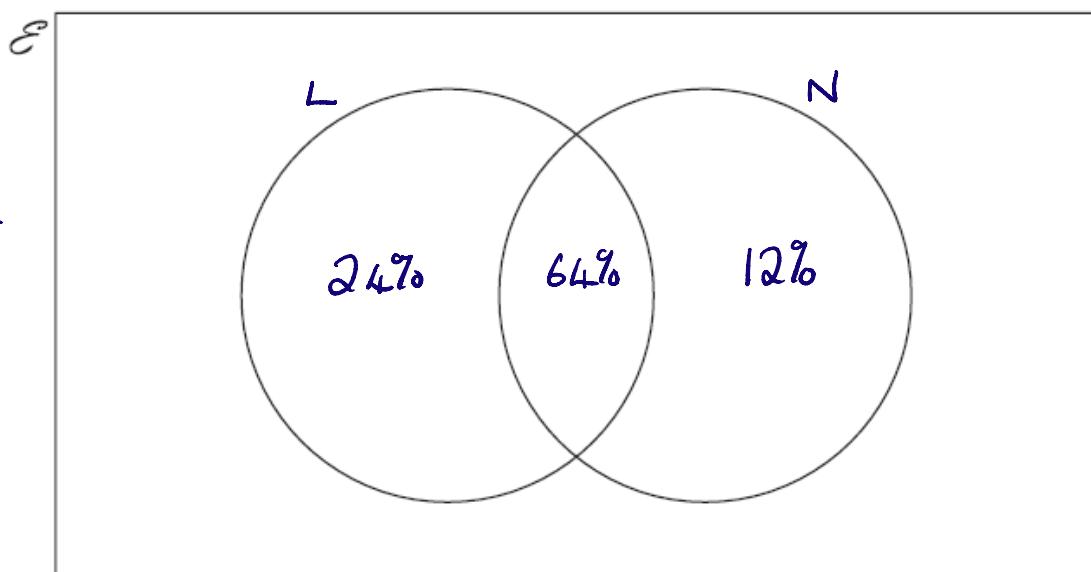
88% passed the literacy section and 76% passed the numeracy section.
12% didn't pass *24% didn't pass*

a) Represent this information on a Venn diagram.

Show clearly the percentage in each section of the diagram.

$$24 + 12 = 36$$

$$100 - 36 = 64$$



[3]

b) One person is chosen at random from all the people who took the skills test that day.

What is the probability that this person

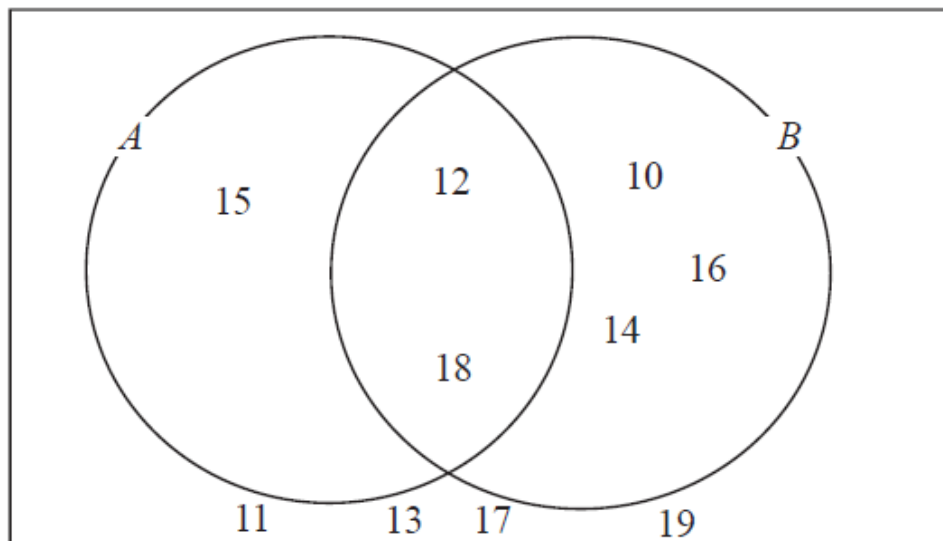
i) passed the numeracy section, given that they passed the literacy section,

b)(i) 64% $\frac{64}{100}$ [2]

ii) passed the literacy section, given that they passed only one section?

(ii) $\frac{24}{36}$ [2]

4. Here is a Venn diagram.



(a) Write down the numbers that are in set

(i) $A \cup B$

..... $10, 12, 14, 15, 16, 18$

(ii) $A \cap B$

..... $12, 18$

[2]

One of the numbers in the diagram is chosen at random.

(b) Find the probability that the number is in set A'

$10, 11, 13, 14, 16, 17, 19$

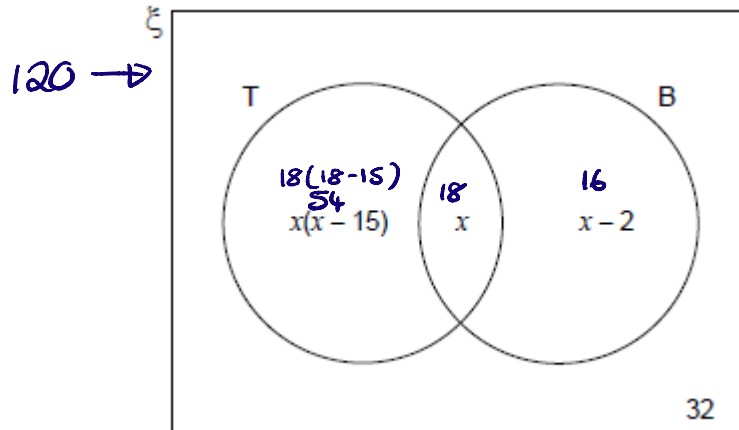
10 numbers in total

..... $\frac{7}{10}$

[2]

5. The Venn diagram shows information about a coin collection.

$\xi = 120$ coins in the collection
 T = coins from the 20th century
 B = British coins



A coin is chosen at random.

It is British.

Work out the probability that it is from the 20th century.

$$T \cup B = 120 - 32 = 88$$

$$x(x-15) + x + x-2 = 88$$

$$x^2 - 15x + 2x - 2 = 88$$

$$x^2 - 13x - 90 = 0$$

$$(x-18)(x+5) = 0$$

$$x = 18 \text{ or } x = -5$$

$$P(T) = \frac{72}{120}$$

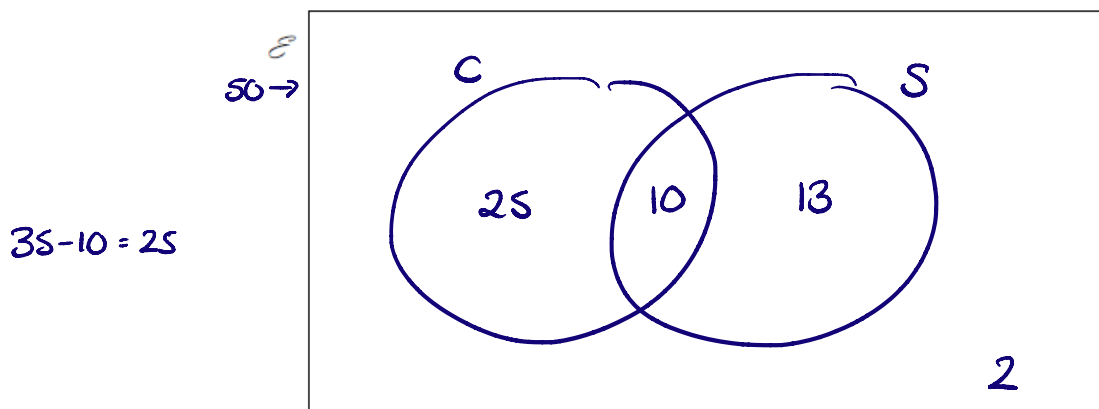
$$\frac{18}{6}$$

[5]

6. An activity camp has climbing and sailing classes.

- 50 children attend the activity camp.
- 35 children do climbing.
- 10 children do both classes.
- 2 children do neither class.

(a) Represent this information on a Venn diagram.



$$25 + 10 + 2 = 37$$

$$50 - 37 = 13$$

$$35 - 10 = 25$$

[3]

(b) A child attending the activity camp is selected at random.

Find the probability that this child

(i) did exactly one class,

$$25+13$$

$$(b)(i) \dots\dots\dots \frac{38}{50} \dots\dots\dots [2]$$

(ii) did sailing, given that they did not do climbing.

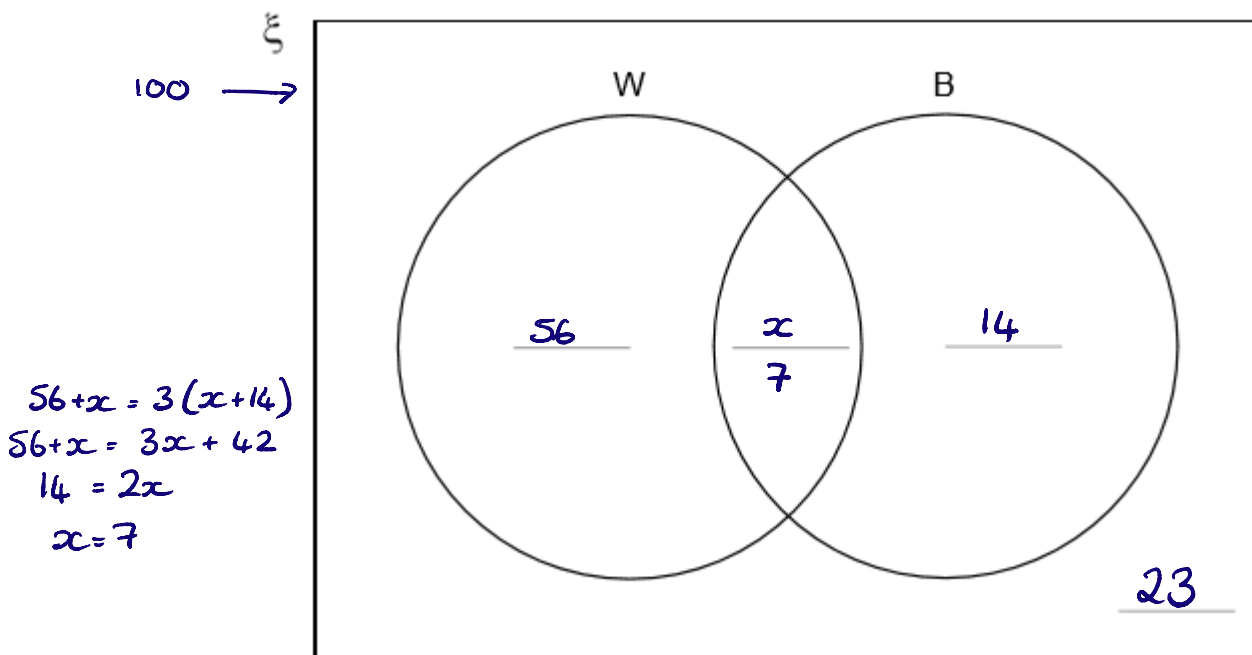
$$(ii) \dots\dots\dots \frac{13}{15} \dots\dots\dots [2]$$

7. In the Venn diagram

$$\xi = 100 \text{ farms}$$

W = farms that grow wheat

B = farms that grow barley



70 farms grow only wheat or only barley.

$\frac{4}{5}$ of these 70 farms grow only wheat. $\frac{4}{5}$ of 70 $\frac{1}{5} = 14$ $\frac{4}{5} = 56$

The number of farms that grow wheat is three times the number that grow barley.

Complete the Venn diagram.

[5]

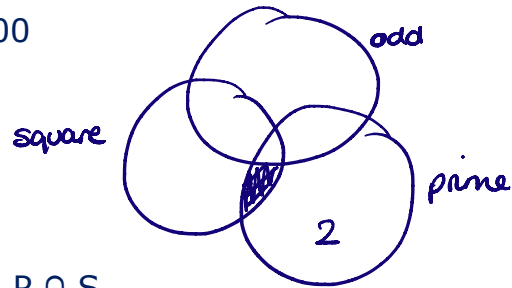
8. The universal set contains the whole numbers 1 to n .

n is an even number greater than 100

O is the set of odd numbers.

P is the set of prime numbers.

S is the set of square numbers.



a) Explain why there are no numbers in $P \cap S$

There are no square numbers that are prime

[1]

b) How many numbers are there in $O \cup P$? Circle your answer.

$$\frac{n}{2} - 1$$

$$\frac{n}{2}$$

$$\frac{n}{2} + 1$$

$$n$$

[1]

CREDITS AND NOTES

| Question | Awarding Body |
|----------|-----------------|
| 1 | AQA |
| 2 | Pearson Edexcel |
| 3 | OCR |
| 4 | Pearson Edexcel |
| 5 | AQA |
| 6 | OCR |
| 7 | AQA |
| 8 | AQA |

Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.



Links:

AQA <http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300>

OCR <http://ocr.org.uk/gcsemaths>

Pearson Edexcel <http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html>

WJEC Eduqas <http://www.eduqas.co.uk/qualifications/mathematics/gcse/>

Contents:

This version contains questions from:

AQA – Sample Assessment Material, Practice 1 and Practice set 2

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2

WJEC Eduqas – Sample Assessment Material